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ABSTRACT

The following course outline has been prepared as a guide to help the student develop the skills and understanding to succeed in the field of data processing. Operating principles will be studied further and applied with testing and debugging programs. Payroll processing is used to present the students with programing problems and responsibilities of both programers and operators. A prerequisite for the course is Programing and Operations Lab 1. The 90 clock hours course consists of six blocks of instruction (orientation, computer system operations, billing and accounts receivable, documentation, testing and debugging techniques, and employment opportunities) which are further broken down into several units each. Specific block objectives, a course outline, course goals, a 12-item bibliography, and an appendix of Quinmester posttest items and an answer key are included. (Author/BP)

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AUTHORIZED COURSE OF INSTRUCTION FOR THE **QUINMESTER PROGRAM**

U.S. DEPARTMENT OF HEALTH,
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Course Outline
DATA PROCESSING TECHNOLOGY - 8025
(Programming and Operations Lab II - Intermediate)
Department 73 - Quin 8025.24

DIVISION OF INSTRUCTION • 1973

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D A D E C O U N T Y P U B L I C S C H O O L S

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Course Outline

DATA PROCESSING TECHNOLOGY - 8025

(Programming and Operations Lab II - Intermediate)

Department 73 - Quin 8025.24

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VOCATIONAL AND ADULT EDUCATION

Course Description

<u>8025</u>	<u>73</u>	<u>Quin 8025.24</u>	<u>Programming and Operations</u>
<u>State Category</u>	<u>County Dept.</u>	<u>County Course</u>	<u>Lab II - Intermediate</u>
<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Course Title</u>

Using the skills and knowledge obtained from Programming and Operations, Lab I, the students will develop solutions to programming problems. Operating procedures will be studied with the emphasis on operator responsibility in following instructions. The students will become familiar with the various aspects of billing and accounts receivable processing as they further strengthen their skills in programming.

Indicators of Success: The student must have met the objectives of Programming and Operations Lab I prior to enrollment in this course.

Clock Hours: 90

PREFACE

The following course outline has been prepared as a guide to help the student develop the skills and understanding to succeed in the broad field of data processing. Problems are presented to the student to allow him to apply techniques already learned and to increase his knowledge of ways to solve processing problems.

The student has the opportunity to develop programs complete with documentation, flowcharts, coding and operator instructions. The importance of following directions is emphasized throughout this course. An effort is made to increase the student's confidence in his own ability to make decisions as to file layouts, forms design and sequence of runs in operating a system.

In presenting the material outlined in this course, the instructor uses lectures, presentation, student participation, demonstration and student projects as methods of instruction. After instruction and practice on the application that has been studied, evaluation of the student's skill and understanding is made.

Through solving problems connected with billing and accounts receivable processing, the students will learn the terms and procedures common in business data processing. While writing programs is emphasized throughout this course, the student is taught the importance of proper planning of test runs and the value of desk debugging his programs. An effort is made to develop and nurture a feeling of pride in the student and to instill a sense of responsibility in his attitudes, ethics and work habits.

This elective course is one of a series designed for quinmester use. Students who have met the objectives of Programming and Operations Lab I should be admitted to this course.

The class meets two hours per day for 90 clock hours. The outline consists of six blocks of instruction which are further broken down into several units each.

This outline was developed through the cooperative efforts of the instructional and supervisory personnel, the Quinmester Advisory Committee and the Vocational Curriculum Materials Service, and has been approved by the Dade County Vocational Curriculum Committee.

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I. ORIENTATION (2 Hours)	
Objectives of the Course	1
Student Responsibilities	1
Student Benefits	1
II. COMPUTER SYSTEM OPERATION (18 Hours)	
Operator Instructions	1
System Maintenance	1
File Maintenance	1
Central Processor Operation	1
Peripheral Units Operation	1
III. BILLING AND ACCOUNTS RECEIVABLE (36 Hours)	
Creating a Customer Master File	2
Creating a Product Master File	2
Input Requirements	2
Output Requirements	2
Controls and Balancing Procedures	2
Programs Required	2
Billing Routines	2
Accounts Receivable Routines	2
IV. DOCUMENTATION (16 Hours)	
Management Information	3
Flowcharts	3
File Layout	3
Printed Forms Design	3
V. TESTING AND DEBUGGING TECHNIQUES (14 Hours)	
Preparation of Test Data	3
Testing With the Computer	3
Desk Debugging	3
VI. EMPLOYMENT OPPORTUNITIES (4 Hours)	
Job Classifications	3
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GOALS

The student must be able to demonstrate:

1. The ability to prepare proper documentation for a system of programs.
2. The ability to locate errors that may exist in a program through desk-debugging.
3. An understanding of the programming techniques used in problem solving.
4. A knowledge and understanding of the programs required for a billing and accounts receivable application.
5. A knowledge and understanding of terms commonly used in the data processing field.
6. The ability to identify operating problems that may occur from time to time when operating a computer system.
7. An understanding of the traits considered to be desirable in an employee.
8. The ability to prepare proper documentation of a system of programs.

SPECIFIC BLOCK OBJECTIVES

BLOCK I - ORIENTATION

The student must be able to:

1. Explain orally or in writing the requirements of this course.
2. Demonstrate an understanding of the safety regulations he must observe by writing an explanation of each regulation.
3. Explain orally or in writing the student benefits to be derived from this course.

BLOCK II - COMPUTER SYSTEM OPERATION

The student must be able to:

1. Exhibit the ability to follow operator instructions.
2. Demonstrate an understanding of the importance of keeping accurate records by filling in a systems log.
3. Describe in writing file maintenance considerations.
4. Exhibit the ability to follow the correct procedures in central processor operation and to recognize and correct error conditions.
5. Exhibit the ability to follow the correct operating procedures necessary for each peripheral unit and to recognize and correct error conditions.

BLOCK III - BILLING AND ACCOUNTS RECEIVABLE

The student must be able to:

1. Explain orally or in writing the factors to be considered in the creation of a customer and a product master file.
2. Explain orally or in writing the factors to be considered for the input and output requirements.
3. Explain orally or in writing the need for controls and balancing procedures.
4. Demonstrate a knowledge and understanding of the programs required for a billing and accounts receivable application by flowcharting a system

BLOCK IV - DOCUMENTATION

The student must be able to:

1. Explain orally or in writing the factors to be considered in reference to management information, flowcharts, file layouts and printed forms design.

BLOCK V - TESTING AND DEBUGGING TECHNIQUES

The student must be able to:

1. Exhibit the ability to prepare test data.

2. Demonstrate a knowledge and understanding of the proper procedure to be followed in testing with the computer.
3. Demonstrate an understanding of the procedures in desk debugging of the billing and accounts receivable programs.

BLOCK VI - EMPLOYMENT OPPORTUNITIES

The student must be able to:

1. Demonstrate an understanding of job classifications by writing a brief description of each one studied.
2. Explain orally or in writing the desirable employee characteristics studied.

BLOCK VII - QUINMESTER POST-TEST

The student must be able to:

1. Satisfactorily complete the quinmester post-test.

Course Outline

DATA PROCESSING TECHNOLOGY - 8025 (Programming and Operations Lab II - Intermediate)

Department 73 - Quin 8025.24

I. ORIENTATION

- A. Objectives of the Course
 - 1. Requirements
 - 2. Methods of evaluation
 - 3. Teaching methods
- B. Student Responsibilities
 - 1. Care of equipment
 - 2. Use of materials
 - 3. Safety regulations
 - 4. Class absences
- C. Student Benefits
 - 1. Pride in self
 - 2. Individual development of skills
 - 3. Employability

II. COMPUTER SYSTEM OPERATION

- A. Operator Instructions
 - 1. General system
 - 2. Specific program application
- B. System Maintenance
 - 1. Environmental conditions
 - 2. Equipment malfunctions records
 - a. Down time
 - b. Service record
- C. File Maintenance
 - 1. Library
 - 2. Utility
 - 3. Security
- D. Central Processor Operation
 - 1. Error conditions
 - 2. Memory registers
 - 3. Operator log
 - 4. Dating
- E. Peripheral Units Operation
 - 1. Normal run
 - 2. Error conditions
 - 3. Malfunctions

III. BILLING AND ACCOUNTS RECEIVABLE

- A. Creating a Customer Master File**
 - 1. Contents
 - 2. Structure
- B. Creating a Product Master File**
 - 1. Contents
 - 2. Structure
- C. Input Requirements**
 - 1. Data source
 - 2. Transaction file structure
 - 3. Transaction file contents
 - 4. Fields for validation
- D. Output Requirements**
 - 1. Updated master file
 - 2. Invalid items report
 - 3. Customer invoices
 - 4. Other reports
- E. Controls and Balancing Procedures**
 - 1. Establish controls
 - 2. Maintain audit trail
 - 3. Effective balancing methods
- F. Programs Required**
 - 1. Validation run
 - 2. Update master file
 - 3. Customer billing
 - 4. Invoice preparation
 - 5. Trial balance
 - 6. Master file changes
- G. Billing Routines**
 - 1. Coding
 - 2. Pricing
 - 3. Extensions
 - 4. Invoice preparation
 - a. Prebilling
 - b. Postbilling
- H. Accounts Receivable Routines**
 - 1. Credit rating
 - 2. Terms
 - 3. Update customer master record
 - 4. Statements
 - 5. Reports
 - a. Salesman activity
 - b. Sales analysis
 - c. Trial balance/aging
 - d. Customer activity
 - e. Changes

IV. DOCUMENTATION

- A. Management Information
 - 1. Narrative description of system
 - 2. Time schedule
- B. Flowcharts
 - 1. System
 - 2. Run
 - 3. Program
- C. File Layout
 - 1. Transaction file
 - 2. Master file
- D. Printed Forms Design
 - 1. Report formats
 - 2. Statements
 - 3. Invoices
 - 4. Source documents

V. TESTING AND DEBUGGING TECHNIQUES

- A. Preparation of Test Data
 - 1. Dummy transactions
 - 2. Dummy master file
- B. Testing with the Computer
 - 1. Recording the results
 - 2. Single instruction execution
- C. Desk Debugging
 - 1. Recording the results
 - 2. Instruction execution

VI. EMPLOYMENT OPPORTUNITIES

- A. Job Classifications
 - 1. Description
 - 2. Requirements
 - 3. Salary range
- B. Desirable Employee Characteristics
 - 1. Attitudes
 - 2. Ethics
 - 3. Loyalty
 - 4. Work habits
 - 5. Appearance

VII. QUINMESTER POST-TEST

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APPENDIX

QUINMESTER POST-TEST SAMPLE

Quinmester Post-Test

Name _____ Date _____ Score _____

Essay Questions

Read each question carefully. Write your answers neatly and accurately to the best of your ability.

1. What is the purpose of a subroutine?

2. What is a table and why is it used?

3. What is the purpose of a memory flag?

4. When would a computer user choose the selective-sequential accessing method instead of the father-son method?

5. In relation to computer files, define the term overflow.

6. What are the guidelines that should be followed when preparing test data?
7. What factors must be considered prior to creating a customer master file?
8. Why is it important that you be able to desk-debug your programs?

True-False Test Items

Each of the following statements is either true or false. If the statement is true, draw a circle around the letter T following it; if the statement is false, draw a circle around the F. If a statement is false in part it is entirely false.

-
- | | | |
|--|---|---|
| 1. Before building a product master file it is necessary to have a list of all customers. | T | F |
| 2. Item descriptions may be in the form of a code. | T | F |
| 3. Record layouts should be prepared before the file is created. | T | F |
| 4. Customer terms as shown on the invoice will reflect the approximate due date. | T | F |
| 5. Prebilling is the method of shipping merchandise after the invoice has been prepared. | T | F |
| 6. A trial balance is necessary when an out of balance condition occurs during the validation run. | T | F |

- | | | |
|---|---|---|
| 7. Effective balancing methods are established as a guarantee there will never be an out of balance condition. | T | F |
| 8. Dummy transactions are made up by the programmer and used to test a program prior to its use on live data. | T | F |
| 9. Execution of one instruction at a time and halting after each instruction is helpful when debugging on the computer. | T | F |
| 10. Dummy transactions are not required when you desk debug a program. | T | F |

Define the terms listed below. Each definition should be brief but accurate. The terms are grouped to indicate what they are related to in the field of data processing.

Aptitudes

1. Verbal -
2. Spatial -
3. Numerical -
4. Form Perception -
5. Motor Coordination -
6. Color Discrimination -
7. Intelligence -
8. Clerical Perception -

9. Manual Dexterity -

10. Finger Dexterity -

Physical Activities

1. Sedentary Lifting -

2. Handling -

3. Visual Acuity, far and near -

4. Depth Perception -

5. Vision Accommodation -

Environmental Conditions

1. Humid -

2. Temperature Changes -

3. Noise and Vibration -

4. Hazards -

5. Dusts -

Identification Test Items

Listed below are the duties of various job classification in data processing. Read each description carefully and identify the job classification. Place your answers in the spaces provided.

1. Converts routine items of information obtained from records and reports into codes for processing. _____
2. Monitors and controls electronic digital computer to process business, scientific, engineering or other data, according to instructions. Sets control switches, selects and loads input and output units. Notifies supervisor of equipment malfunctions. _____
3. Converts symbolic statement of business problems to detailed logical flowcharts for coding into computer language. Confers with supervisor and department representatives to resolve questions of program intent, internal checks and controls. Writes detailed flowchart and codes into computer language used. Tests and debugs programs. _____
4. Analyzes business problems to refine formulation and convert to programmable form. Studies current or develops new systems and procedures. _____

ANSWER KEY TO QUINMESTER POST-TEST

Essay Questions

1. A self-contained group of instructions that may be entered from various points in a program to perform a specific task more than once during the program.
2. A table is a systematic organization of data arranged to permit a quick lookup of information such as withholding tax or transaction codes.
3. A location in memory that is used by the programmer to record decisions or conditions to be used by the programmer to determine a course of action later in the program.
4. To process a low-activity master file. This would save copying time and avoid the tie-up of a file unit during the update run.
5. When there is no room in a file segment for additional records. This can happen with a file block, bucket or section.
6. Care should be taken to include every possible type of transaction the program is expected to process. In addition to all transactions the program expects, all error conditions should be represented in the test data. Test data should be itemized prior to testing and the anticipated results recorded. Actual test results can then be compared for fast, efficient and effective answers that will aid in debugging.
7. What information is to be contained and in what format. Once it is determined just what should be included on the customer master file, we must then consider if the length of the file is feasible or should we maintain a separate file for name and address.
8. Computer time is valuable and may very well not be available for testing purposes. Desk-debugging is an effective way to save computer time and programming personnel time.

True-False Test Items

- | | |
|------|-------|
| 1. F | 6. F |
| 2. T | 7. F |
| 3. T | 8. T |
| 4. T | 9. T |
| 5. T | 10. F |

Definition Test Items

Aptitudes

1. The ability to understand words and ideas associated with them. To use words and ideas effectively. To comprehend language and to present information or ideas clearly.
2. Ability to comprehend forms in space and understand relationships of plane and solid objects. Ability to visualize objects of two or three dimensions.
3. Ability to perform arithmetic operations quickly and accurately.
4. Ability to perceive pertinent detail in objects or in pictorial or graphic material.
5. Ability to coordinate eyes and hands or fingers rapidly and accurately in making precise movements with speed.
6. Ability to recognize similarities or differences in colors, or in shades or other values of the same color.
7. The ability to understand instructions and underlying principles. Ability to reason and make judgments.
8. To observe differences in copy, to proof-read words and numbers and to avoid perceptual errors in arithmetic computation.
9. Ability to move the hands easily and skillfully.
10. Ability to move the fingers and manipulate small objects with the fingers quickly and accurately.

Physical Activities

1. Lifting 10 pounds maximum. Includes lifting and/or carrying dockets, ledgers, small tools and other items,
2. Working with the hand or hands. Seizing, holding, grasping or turning with the hand(s).
3. Far acuity is clarity of vision at 20 feet or more. Near acuity is clarity of vision at 20 inches or less.
4. Three-dimensional vision. Ability to judge distance and space relationships so as to see objects where and as they actually are.
5. Adjustment of the lens of the eye to bring an object into sharp focus.

Environmental Conditions

1. Atmospheric condition with moisture content sufficiently high to cause bodily discomfort.
2. Marked and abrupt variations in temperature to cause bodily reactions.
3. Sufficient noise to cause marked distraction or possible injury to the sense of hearing and/or sufficient vibration to cause bodily harm if endured day after day.
4. Conditions or situations in which there is danger to life, health or bodily injury.
5. Solid particles, generated by handling, crushing, grinding, rapid impact, detonation and decrepitation of organic and inorganic materials.

Identification Test Items

1. Coding Clerk
2. Computer Operator
3. Programmer, Business
4. Systems Analyst, Business